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ABSTRACT

This paper attempts to locate a leitmotif for the mathematics education of adults, and discusses whether there exists a specific problematique for research into this area. The term 'problematique' is described and discussed. A problematique within didactics of mathematics is presented, and a conceptual framework for the construction of a systemically linked problem field is explicated. Contains 10 references. (ASK)

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Could there be a specific problematique for research in adult mathematics education?

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Introduction

In this paper I will attempt to locate a leitmotif for the mathematics education of adults and discuss whether there exists a specific 'problematique' for research into this area. I will explicate a conceptual framework for the construction of a systematically linked problem field. At the session at ALM-4 we discussed the didactics of mathematics as a specific problematique, and I include comments made by some of the participants.

Adult education is a growth area and the same is true of research into adult education. However, as we know 'adults and mathematics' is a relatively uncultivated area of research on mathematics education, but it is also an area with increasing activity. In the new international handbook there is an entry for 'adults' for the first time ever in a reference work on research on mathematics education. (Bishop et al., 1996) In fact there is a whole chapter entitled "Adults and Mathematics (Adults' Numeracy)". At the 8th International Congress on Mathematical Education, in Seville 1996 (ICME 8), for the first time one of the groups was organized around the theme of 'Adults returning to mathematics education'. (FitzSimons, 1997)

'Heterogeneity' is the very term for description of the field of research in adult teaching and learning of mathematics. This is the message in the above mentioned chapter of the handbook. (FitzSimons, Jungwirth, Maasz, & Schlöglmann, 1996). Indeed, as a field of practice 'adults' mathematical education' is very complex, and the ways of constructing the object of study are innumerable. For example there are two different points of view - society's demand for mathematical knowledge as against the needs of individuals - which give rise to several sub-fields of research.

There does not exist a total paradigm or a 'grand narrative' concerning adults and mathematics. Nevertheless, I think that it is possible to locate a leitmotif that cuts across the different fields. The issue I wanted to discuss in my session at the conference ALM-4 was:

* Could there be a specific 'problematique' for research in mathematics education of adults (teaching and learning) that is different from a 'problematique' concerning children's education?

At the conference we had a preprint of Gail FitzSimons reflections on ICME 8. As a chief-organizer of the Working Group 18 (Adults returning to study mathematics) she is too the editor of the proceedings:

> As I read through the range of papers several things impressed me. There is an outstanding level of commitment by the authors to the adults with whom they have been

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> working: They show caring and compassion for their students' best interests. (...) In many countries, such as my own, adults returning to study in general, and to mathematics in particular, are expected to pursue purely instrumental, vocational directions, such as those espoused by economic rationalists whose current influence on educational policy is greater than is warranted.(...) However, I see that these papers highlight the need to focus on the discourse of adult education in mathematics, in order to see mathematics education as a positive way of enabling all people to direct their own lives as critical citizens in the world they inhabit. (FitzSimons, 1997:8)

As some kind of evidence I quoted this to open my session. And inspired by the theoretical work of the French philosopher Louis Althusser (Althusser, 1968), I tried to construct an epistemological concept of *problematique* which was used as a tool in my analysis of papers from the two first ALM conferences (Coben, 1994 & 1995). In this way I hoped to create a jumping-off point for a theoretical discussion.

The term 'problematique'

All the participants at the session were able to speak and understand English. Some German and some of us French too. To have a common reference I started out by presenting the term 'problematique':

In the French dictionary we are told that the noun 'problématique' comes from the German 'Problematik', which has the same two basic meanings as the Danish noun 'problematik': 1) Schwierigkeit (einer Aufgabe, einer Frage); 2) Gesamtheit der Probleme einer bestimmten Angelegenheit; eg. die Problematik der Jugendarbeitslosigkeit. But the French word 'problématique' has only the second meaning, and it can only be translated as 'problem field' not as 'problem'. Since the 1950's 'problématique' has furthermore a more specific meaning where the coherence within the problem field is defined by a science or a theory:

> Ensemble de problèmes élaborés par une science donnée et considérés come délimitant le domaine qui lui est propre. (Trésor de la Langue Francaise. Dictionnaire de la langue du XIVe et du XX siècle. 1988)

In an ordinary dictionary we only find the english word 'problematic' (alt.: -ique) as an adjective. But in The Oxford English Dictionary (1989) 'problematic' is also given as a noun: "Something that constitutes a problem, or an area of difficulty in a particular field of study." The first example given is from 1957:"R.K. Merton "Social Theory": Working out its problematics, i.e. the principal problems (conceptual, substantive and procedural)."

Defining a problematique within didactics of mathematics

My own studies are in the border area between sociology, adult education and *didactics of mathematics* (meaning the scientific discipline related to research and development work in mathematics education). In my doctoral thesis the task is, first and foremost, to make a contribution to the construction of a problematique in the field of didactics of mathematics within

which problems can be formulated (in the form of questions and answers) concerning adults, mathematics and technology at the work place. My interest in 'adults and mathematics' is that of the educational planner, and I have chosen mathematics education as my research field, and not adult education in general. But my point of departure is that educational reforms must address the social nature of work, including the capacity to understand and modify technology and organization. The preliminary question defining my problem field was:

> Is it possible that mathematics teaching and learning could provide unskilled workers with the possibilities to develop technological competencies which may place them as subjects in relation to the technology in their workplace? (Wedege, 1995:53)

"But are you sure that the answer is mathematics teaching?" asked an educational researcher. The research field of mathematics education offers a specific focus, while at the same time the problem field i narrowed down. In my doctoral thesis the term 'problematique' will be defined an discussed as an epistemological concept. At the session I presented the terminology as follows:

Firstly, I delimit the *subject area* (adult - mathematics - technology) and formulate a simple structure. Taking my point of departure in a certain position, I then adopt a certain view of the subject and identify a *problem field* concerning the area. The problem field is defined in such a way as to make it possible to formulate *problem complexes* concerning the didactics of mathematics within it. In this way the subject is further structured and becomes a *subject field*. My task can now be described as:

> The construction of a systematically linked problem field, a *problematique* in the didactics of mathematics, in which problem complexes are formulated as *problems* in the form of questions and answers about the subject field on the basis of a certain theoretical and/or methodological approach. The subject field is opened and closed at the same time in this process.

This conceptual framework may be illustrated like this:

<table>
<tr><td colspan="3">subject area (SA)</td></tr>
<tr><td colspan="2">a problem field (PF) concerning SA</td><td></td></tr>
<tr><td></td><td>problem complexes within PF</td><td></td></tr>
<tr><td colspan="3">a subject field (SF)</td></tr>
<tr><td colspan="2">a problematique (P) concerning SF</td><td></td></tr>
<tr><td></td><td></td><td>problems (questions & answers) within P</td></tr>
</table>

The subject field is defined and structured when problem complexes concerning the subject area are formulated. For example: Why is mathematics an important subject in adult vocational training in Denmark? The Danish proverb, "Som man raaber i skoven får man svar" (corresponding to something like "You get what you're asking for") represents the basic idea in this concept of problematique. My work of construction is based on various theoretical points of view and with a point of departure in a limited number of theses by which means the problem field is narrowed down and focus is on certain problem complexes. A significant part of the work consists in discussing the compatibility of different theories of knowledge, learning and qualification.

The first delimitation and structuring takes place by defining the subject area. It is possible to draw the contours of three superordinate subjects of research in the didactics of mathematics within or across which the specific subject fields are construed and structured, and, in addition, a fourth subject area which is structured as an epistemological subject field. They are as follows:

(1) Mathematics teaching

Problem complexes, which can also be interdisciplinary, begin with: why, what, how, who, and where?

These includes problem complexes concerning teacher training/ qualifications and the cultural and societal function of the teaching.

The focus is on communicating mathematics.

(2) Learning mathematics

The problem complexes begin with : who, what, how and where? They have to do with what is specific about learning mathematics, both the cognitive processes and the conditions for the learning processes, the means, the situations/contexts, and the barriers.

The focus is on the learner.

(3) Mathematical knowledge and attitudes to mathematics.

a) Knowledge and attitudes as

(i) a result of participating in teaching and/or learning in other connections, and

(ii) background/qualification for participating in teaching/education.

b) Knowledge and attitudes in culture, social life, working life etc.

The problem complexes start with: what, where and who?

The focus is variously on human knowledge or mathematics, the context or the situation (teaching, working life, social life, culture etc.)

The two subject areas, (2) learning mathematics and (3) mathematical knowledge, may only be separated analytically by distinguishing between process and product. The subjects complement each other in the sense that the one does not exist without the other. New concepts of knowledge which replace 'knowledge' with 'knowing' attempt to escape the dichotomy between product and process.

The constitution of the didactics of mathematics as a scholarly discipline creates a fourth subject of theoretical and historical epistemological research.

(4) The didactics of mathematics.
- history, theory, methodology etc.
The focus is on dicactics of mathematics as a practice.

Our meta-discussion at ALM-4 about research on 'adults and mathematics' as a specific problematique within the field of research in mathematics education dealt with the fourth subject area, didactics of mathematics.

'Adults education and mathematics' as a complex subject area
I regard 'adults education and mathematics' as a complex subject for didactics of mathematics, whether the focus be on teaching, learning, or knowledge. Thus delimiting the field of study (subject area and problem field) is a central part of the research. In my view the complexity is based on at least three vital, inter-connected conditions which have to do with knowing, learning and teaching of adults:

(1) Mathematics teaching

Adults have opportunities to learn (or not to learn) mathematics in adult or further educational systems and/or in everyday practice. There is a large variety of formal adult education programs where mathematics is taught as a separate subject or integrated in other subjects, and where the objectives are either mathematical, general or specific vocational competence.

The subject area (1) is defined in a way that opens up to math-containing teaching and instruction[1] in formal and informal settings.

(2) Learning mathematics

The situation for learning mathematics depends on the experience of the individual adult with mathematics in school and everyday practice and their individual perspectives for learning. Emotional factors are just as important as cognitive ones in the psychological learning process. Someone have the taste for mathematics, others don't. (Wedege, 1997)

(3) Mathematical knowledge and attitudes to mathematics

Knowing mathematics is a contextually determined and thus relational concept in the adult world. Whether or not an adult knows mathematics can only be answered after the questions such as who, where, what and when.

The subject area (2) is defined in a way that opens up to math-containing competencies and skills. The construction and further development of a concept of 'numeracy' as an everyday

[1] I use the word 'math-containing' as in the German 'mathematik-haltige weiterbildung'(Jungwirth et al. 1995)

competence is task that all researchers relate to in some way or another:

> There is, in some countries, debate about the distinction between the terms mathematics and numeric. The pragmatic solution adopted by the Working Group was to incorporate all possible terms which address the learning of mathematics including for example, statistical literacy, without debate. (FitzSimons, 1997:8)

I regard the fruitfull dialogue in the Working Group at ICME8 and at the ALM conferences as some kind of evidence that there is some kind of common understanding of the basic question: What is mathematics? Or at least to the question: What is mathematics not?

As stated by Roseanne Benn the view of mathematics is a determinating factor for research and teaching. She outlines two of the different (incompatible) views of mathematics:

1) Mathematics as a certain an neutral subject.
2) Mathematics as a social construct.

And she argues that they lead to two fundamentally different approaches to teaching and learning mathematics. The danger of regarding mathematics as an absolute subject is that it may lead to an absolutist pedagogy which ensures that mathematics remains a collection of rules and facts to be remembered.

> As has been illustrated earlier, practitioners in the field who are teaching these groups /groups that consistently underachieve in our educational system (ethnic minorities, the working class and girls/women)/ have developed alternative approaches. They set mathematics in a historical, cultural and socio-political environment and they ensure a more relevant syllabus set in the context of every-day life. They ensure that mathematics is seen like other disciplines as a negotiated journey, a quest and a voyage of discovery. (Benn, 1995:25)

The debate is to bee continued

I shall end up by quoting some of the participants from the debate at the session:

Dhamma Colwell.

> When you talk about 'mathematics education'. I think - Oh, that is not what I'm doing.

Sylvia Johnson.

> I see a big difference between learning mathematics 1) as advanced math at a university level and 2) at a vocational level (or numeric). The meaning of mathematics is different.

John O'Donoghue.

> We have a complex of problems. What constitutes our area? Is it a legitimate scientific activity? When we went to ICME last year, we made a choice. It was a hard decision: Is research in Adults Learning Mathematics a subfield of the field of Mathematics

Education, or is it not?"

Diana Coben.

I see 'adults and mathematics' as a field where we can meet as researchers and practitioners with different backgrounds from different fields, i.e. adult education in general and mathematics education."

Jürgen Maasz.

When we talk about putting limits in the field of research, it should not mean 'putting someone outside'. We should talk about theories, not about membership of the ALM community."

John O'Donoghue.

I suggest to use the word 'define' in stead of 'limit' in relation to research in children's mathematics education. The term 'limiting' is saying that we cannot use the findings concerning the children and young people.

As one can see this is a very complex issue which can be formulated at different levels and from different points of views. Thus Roseanne Benn suggested that we continue the debate at the ALM-5 conference next year in Utrecht.

References

Althusser, Louis (1968) Lire le Capital I - II. Paris: Francois Maspero

Benn, R. (1995) 'Mathematics: Certainty in an Uncertain World?' in Coben, D. (ed.) Mathematics with a Human Face. Proceedings of ALM-2 the Second Conference of Adults Learning Maths - A Research Forum, 7-9 july 95. London: Goldsmiths University of London. 20-25

Bishop, A.J.; Clements, K.; Keitel, K.; Kilpatrick, J.; Laborde, C. (eds.) (1996) Handbook in Mathematics Education. Dordrecht: Kluwer Academic.

Coben, D. (ed.) (1994) Proceedings of ALM-1 the First Conference of Adults Learning Maths - A Research Forum, 22-24 July 95. London: Goldsmiths University of London.

Coben, D. (ed.) (1995) Mathematics with a Human Face. Proceedings of ALM-2 the Second Conference of Adults Learning Maths - A Research Forum, 7-9 july 95. London: Goldsmiths University of London.

FitzSimons, G.; Jungwirth, H.; Maasz, J.; Schlöglmann, W. (1996) 'Adults and Mathematics (Adult Numeracy)' in Bishop, A.J. et al. (eds) Handbook in Mathematics Education. Dordrecht: Kluwer Academic. 755-784

FitzSimons, G. (ed.) (1997, in press) Adults returning to Study Mathematics. Papers from Working Group 18, ICME8. Adelaide: The Australian Association of Mathematics Teachers Inc.

Jungwirth, H.; Maasz, J.; Schlöglmann, W. (1995) Mathematik in der Weiterbildung. Abschlussbericht zum Forschungsprojekt. Linz: J. Kepler Universität.

Wedege, T. (1995). 'Technological Competence and Mathematics' in Coben, D. (ed.) Mathematics with a Human Face. (See above) 53-59

Wedege, T. (1997). 'To know or not to know mathematics - that is a question of context.' (Manuscript submitted for publication)